

speed at which the band passes between the poles of that electromagnet. But in order to obtain the amplification of the sound in this manner, it is apparent that the band must be moved more quickly when used to repeat the message than it was when used to record it, and thus the increased loudness will be accompanied by an increased quickness, and probably at a sacrifice of clearness due to the alteration in pitch. For if the speed of the band when used for recording be increased, the effect will be merely to spread out the message along the wire, as the intensity of the magnetisation set up in the wire depends only on the strength of the currents transmitted through the telephone, and this strength is determined by the loudness and quickness with which the message is spoken at the transmitting end.

The invention of Herr Poulsen may be looked upon as the invention of a magnetic phonograph, and must be regarded as an extremely ingenious and beautiful attempt at the solution of the problem of recording telephonic messages. It possesses many advantages over the combination of the telephone and the wax-cylinder phonograph, especially in the fact that the recording is effected by the immaterial agency of magnetism, and not by the mechanical agency of a style writing on wax, so that the imperfections in the articulation due to mechanical causes should be entirely absent. The method of increasing the loudness by the use of a number of parallel bands appears exceedingly simple, and offers a possible means of making a telephonic relay, and thereby increasing the limits of distance to which sound can be transmitted; it is a method which might be imitated with the ordinary phonograph, by causing the message recorded on the wax cylinder to be repeated to one or more other cylinders, and finally making all repeat their records simultaneously; but in this case the practical difficulties would be very much greater. That Herr Poulsen's invention is still only in an experimental stage may be gathered from the fact that though the instrument itself is on view at Paris, it has been found too difficult at the Exhibition to make the necessary adjustments to exhibit it in operation publicly; but we await with interest its further development, for the introduction of a trustworthy recording telephone would be a benefit to the public, for which it is to be hoped they will not have long to wait.

#### NOTES.

THE French Minister of War has invited the Paris Academy of Sciences to advise as to the precautions to be adopted in selecting and planting trees in the neighbourhood of powder magazines, in order to secure the best protection from lightning.

THE Chancellor of the German Empire has issued an ordinance to the effect that the Réaumur thermometer will not be admitted to official control after January 1, 1901. This will lead to the exclusive use of the centigrade thermometer in Germany.

THE International Congress of Physics, held in Paris last week, appears to have been a complete success, more than a thousand members, including leading physicists of many nationalities, having been obtained. Lord Kelvin received a grand ovation at the opening meeting, and was nominated honorary president of the Congress.

M. OUSTALET and M. Depousarques are the two candidates who have been nominated by the Paris Academy of Sciences for the chair of zoology in the Muséum d'Histoire naturelle, rendered vacant by the death of Prof. Milne-Edwards. The appointment rests with the Minister of Public Instruction.

THE *Athenaeum* announces that Prof. Virchow has been elected an honorary member of the Mathematical and Natural

Science Section of the Vienna Akademie der Wissenschaften, while Prof. Klein, of Göttingen, has been appointed corresponding member of the same section.

THE attention of persons interested in zoological gardens and keeping captive animals should be directed to the passing of the "Act for the Prevention of Cruelty to Wild Animals" (63 and 64 Vict., Ch. 33), which has just become law. This Act extends the provisions of the "Cruelty to Animals Acts 1849 and 1854" (which related to domestic animals only) to all birds, fishes and reptiles not included in that Act. By Sect. 2 of the new Act, "Any person shall be guilty of an offence who, whilst an animal is in captivity or close confinement, or is maimed, pinioned, or subjected to any appliance or contrivance for the purpose of hindering or preventing its escape from such captivity or confinement, shall, by wantonly or unreasonably doing or omitting any act, cause or permit to be caused any unnecessary suffering to such animal; or cruelly abuse, infuriate, tease, or terrify it, or permit it to be so treated." Any person committing such an offence may be proceeded against under the Summary Jurisdiction Acts, and on conviction is liable to be imprisoned for three months or fined £5.

A REUTER telegram from St. Petersburg states that the Imperial Academy of Science has just received news from the Russian expedition at Spitsbergen stating that in the month of September last the members of the expedition in question had erected, at Horn Sound, observatories for conducting meteorological, magnetic, astronomical and astrophysical researches. On October 20 the sun disappeared for four months, and at the end of October absolute and continuous night set in. The members of the expedition applied themselves constantly to scientific observations after November 17. On February 22 the sun was seen again for the first time. On June 5 and 8 the first boats arrived, ending the complete isolation of the expedition, which had lasted for nine months.

THE annual meeting of the French Association for the Advancement of Science was recently held at Paris. General Sebert, the president, delivered an address on the progress of mechanical industries and the means of developing them. In the course of his remarks he alluded to the value of technical education and research as factors in national advances. "It is noteworthy," he said, "that progress in mechanical industries has always coincided with the development of technical education in the countries in which the industries are carried on. The most rapid progress takes place in the countries where institutions for experiment and research are most numerous. Wherever research laboratories have been established to permit the study of the best conditions of invention, there the most marked advances first take place." The Association's grants for scientific purposes, made at the recent meeting, amounted to 21,241 francs, or about 850*l.*

MR. A. R. HUNT, writing from Torquay with reference to our note (p. 322) on the rumbling sounds heard at Bognor and Torquay on July 18, says: "I happened to go into my garden a few minutes after ten on the date named, and was at once conscious of a very unusual pulsating rumble. My first idea was earthquake, but the sound came steadily from one point, roughly south-east; and at last died away into distinct taps." The observation is interesting in showing how far the individual reports can be heard (see p. 378).

MR. J. STIRLING, Government geologist of Victoria, New South Wales, is at present in London as the mining representative of the Victorian Government, and during his stay here proposes to address some of the scientific, professional and mining

organisations of the United Kingdom on matters of original research in Australasia. He will give an address at the Convention of Mining Institutes of Cornwall during August, and subsequently at Manchester, Bristol and other centres.

SOME interesting information as to the actual experience of nations who have adopted the metric system is given in a number of reports from Her Majesty's consular and other officers in Europe, which have just been brought together and published by the Foreign Office. H.M. representatives in twenty-two States were asked to give information upon the following points. (1) The ease or difficulty with which the change of systems was made, the manner of introduction of the metric system, and the time occupied in making the change; (2) How far the metric system is satisfactory in its practical operation, and whether there is any desire to return to former systems; (3) As to the effect the adoption of the metric system has had upon the commerce of the nations adopting it. The answers received to these questions go to show that the best way to introduce the metric system is to make it compulsory after a specified period. The change from the old to the new system is slow in country districts, but as new generations come on familiar with the metric measures the old measures gradually drop out of use. In Turkey, the difficulties of enforcing the system upon an ignorant and illiterate people have proved insurmountable; but in the majority of States from which information has been received, the system is becoming more extensively used every day. Once the system has been adopted there is no desire to return to the old measures, and the effect upon commerce is always beneficial. In fact, the reports greatly strengthen the position of those who urge that the metric system should be adopted in England, if only for the sake of British trade.

It was mentioned in these columns some time ago that the wire fencing of great sheep farms in some parts of Australia was used as telephone wires. A recent report from H.M. Consul at Philadelphia states that this system of communication is being employed by farmers between the towns of Anderson, Pendleton and Ingalls, in Indiana. The top wire of a barb-wire fence is used as the conductor, the continuity of the line being assured by special devices at highways and railway crossings. The line is fourteen miles in length with five stations, two at Anderson, two in Pendleton, and one at Ingalls. Local farmers state that they have used the "fence-line" to converse with friends eight miles distant, and this at a time when the fence posts were still saturated with the morning dew, a condition under which the line is supposed to work with least satisfaction. It is stated that the line has been such a practical success that the farmers of the neighbourhood are organising companies for the purpose of placing themselves in telephonic communication throughout the whole district.

AN excellent article dealing with the photographic side of the suggestions as to analytical portraiture made by Mr. F. Galton in NATURE of August 2 appears in *Photography* of August 9. Illustrations are given of results obtained by combining two portraits of a single person in the same pose, but having different expressions during the two exposures. In one picture the sitter has a normal expression; in the other he is smiling. A transparency was made from the normal negative; and when this positive and its negative were superimposed they neutralised one another. But by placing the positive of the normal expression of face upon the negative of the smiling expression, the two do not, of course, exactly obliterate one another. Certain parts of the features are common to both, and these disappear when the different positive and negative are superimposed, leaving only portions which represent the smile of the sitter's features. In a similar way, by superimposing the positive of a glum portrait upon the negative of a normal

expression, it is possible to obtain differences representing an individual's glumness. Readers of "Alice in Wonderland" will remember that the Cheshire cat gradually disappeared and left only its grin behind. This facetious idea has now been realised, for as our enterprising contemporary points out, Mr. Galton's analytical portraiture shows how the factors of a grin or a scowl can actually be discriminated, so that a grin can be obtained without the face upon which it appeared.

A REUTER telegram from Liverpool, dated August 12, makes the following announcement:—The second malarial expedition of the Liverpool School of Tropical Medicine has just wired home from Bonny, in Nigeria, news of a most important discovery—viz. that the parasite which causes elephantiasis has, like that which causes malaria, been found in the proboscis of the mosquito. Oddly enough, the same discovery has just been simultaneously made by Dr. Low in England in mosquitoes brought from Australia, and by Captain James in India. Elephantiasis is a disease which causes hideous deformity in thousands, or rather millions, of natives in tropical countries, and sometimes in European residents. It is due to a small worm which lives in the lymphatic vessels and occludes them. The fact that this worm can live also in the mosquito has long been known, but the discovery of it in the insect's proboscis shows that it enters the human body by the bites of these pests. Europeans in the tropics are indebted to mosquitoes, not only for much discomfort, but for two dread maladies—malaria and elephantiasis; and it is high time that the authorities should begin seriously to consider Major Ross's advice to destroy these insects or their breeding-places wherever practicable.

THE medical papers contain detailed reports of the Thirteenth International Congress of Medicine, which was held in Paris at the beginning of this month under the presidency of Prof. O. M. Lannelongue. Among the representatives of Great Britain were Sir William MacCormac, Sir T. Lauder Brunton, Sir J. Burdon Sanderson, Sir Dyce Duckworth, Sir Felix Semon, and Prof. Simpson. A banquet in honour of Lord Lister was arranged by Prof. Charles Richet and the "Scientia" social society. Speeches expressing admiration of Lord Lister's work, and describing the influence it has had upon various branches of medical and surgical science, were made by Prof. Richet, Dr. Bouchard, Prof. Guyon, Dr. Lucas Championnière, and Dr. Pinard. In his reply, Lord Lister said he regarded the banquet as being in honour of the noble science of surgery and the Royal Society of London, of which he was the president. It showed that the scientific world knew nothing of the misunderstandings between peoples of different nationalities, and that men of science had mutual respect for one another at all times. Lord Lister added: "I have often said, and it gives me pleasure to repeat it this evening, that I owe much to Pasteur. It is true that I was passionately fond of physiology and surgery. The nature of inflammation was the subject of my first investigations. As a surgeon, I deplored the disastrous results which often followed the most skilful operations, and I saw, what many others had doubtless remarked before me, that the most important troubles of a wound were due to changes in the tissues of the body after the operation, and had an external origin. But all my efforts to avoid these complications were unavailing until Pasteur threw a new and strong light upon the subject, and indicated a possible course of action which I have done my best to follow. That is all. If my efforts have been followed by such beneficial results as have been generously described by speakers this evening, the success must, in a great measure, be ascribed to the fortunate chance of my time."

THE report of the Zoological Gardens of Ghizeh, near Cairo, for the year 1899, gives a good account of the progress of this Institution, which, under the rule of its present director, Captain

Stanley Flower, has become a popular place of resort for the European visitors to Egypt, as well as for the Cairenes. The receipts in 1899 were 3033%, of which 968% were for gate-entrances, and the expenditure was 3019%. The list of donors includes many well-known names, amongst which we see those of Sir William Garstin, Prince Omar Tousson, Sir F. Wingate and Lord Kitchener. The Government of India presented an elephant. Various new buildings were erected, and others were reconstructed in 1899. The number of animals in the collection on October 1 of that year was 473, against 270 at the corresponding date in 1898. A list of wild birds that inhabit the Ghizeh Gardens, and in many cases breed there, enumerates nineteen species, amongst which is the European song-thrush (*Turdus musicus*). Two proboscis monkeys (*Nasalis larvatus*), presented by the Government of the Netherlands East Indies, unfortunately did not live long. We are informed that since the report was issued Captain Flower has succeeded in bringing to the Ghizeh Gardens from the Sudan a fine young giraffe, presented by the Sirdar.

WRITING from Mashonaland in May, Mr. G. A. K. Marshall raises, in the August number of the *Entomologist*, what appears to be a pertinent question with regard to mosquitoes and malaria. If it be admitted, he observes, that malaria can only be carried by mosquitoes of the genus *Anopheles*, and that these insects can only acquire the microbes from malarially-infected man, "then we are logically bound to accept the conclusion that if a man, or party of men, free from malarial poison, should penetrate from a healthy area into an unhealthy but uninhabited region, it would be impossible for them to contract fever, however much they might be bitten by mosquitoes. Further, it follows that all uninhabited regions, even of comparatively small size (seeing that the range of individual species of *Anopheles* is apparently very limited in extent) must be entirely devoid of malaria, even though they may be full of swamps and teem with mosquitoes." Such conclusions are, however, contrary to experience, and if the writer's premises be correct, his difficulty requires an explanation at the hands of specialists.

THE Walcott collection of Hymenoptera, now in the Cambridge University Museum, has yielded to the researches of Mr. R. C. L. Perkins (*Entomologists' Monthly Magazine* for August) a species (*Olynerus tomeulosus*) new to the British fauna. Considering that the greater part of the collection was made in the first half of the century, it is not a little remarkable that the species should have escaped notice so long.

THE large scale on which they do things in America has become a proverb. An instance is afforded by Mr. J. B. Smith's description of one hundred new species of moths of the family Noctuidæ in vol. xxii. of the *Proceedings* of the U.S. Museum.

To vol. xxix. No. 13 of the *Proceedings* of the Boston Society of Natural History Dr. H. S. Pratt contributes an important paper on the embryological history of the so-called imaginal discs of the sheep-tick (*Melophagus ovinus*). For the benefit of our non-entomological readers it may be mentioned that these imaginal discs, or folds, are structures in the larva and pupa which do not participate in the general breakdown of tissue at the periodical changes, but undergo continuous development into the corresponding parts of the perfect insect. Hitherto, the author says, these structures have been studied only in the larval and pupal stages; and he for the first time describes their origin and early stages of growth.

FOUR out of the nine papers in Part i. of the *Proceedings* of the Philadelphia Academy for 1900 are devoted to the land and fresh-water molluscs of America. In the first of these Mr.

C. T. Simpson describes a number of new or unfigured river mussels (Unionidæ); the second, by Mr. W. H. Dall, treats of the land-shells of some of the Pacific Islands, more especially those of the Galapagos and Cocos groups; in the third, Mr. H. A. Pilsbry discusses the anatomy of the helicoid genus *Ashmunella*, and in the fourth the molluscs of the Great Smoky Mountains. This last communication is perhaps the one of most general interest, since the author is of opinion that the cleft in the Appalachian chain formed by the valley of eastern Tennessee indicates the boundary between two zoögeographic provinces. The lists of terrestrial molluscs given by him as respectively characteristic of the eastern and western divisions of this portion of the chain seem to bear out his contention as to the existence of two distinct faunas.

THE sixth of the series of physico-mathematical handbooks published by Messrs. Carré and Naud, of Paris, under the title of "Scientia," is a small treatise by M. Fred. Wallerent on crystalline groups and their optical properties. As an introduction to modern crystallography the little volume should be of much use to those interested in other branches of science who are desirous of acquiring a general knowledge of the history and fundamental principles of the subject, and who do not possess the spare time for mastering a larger treatise.

In a short note contributed to the *Atti del R. Istituto d'Incoraggiamento* (Naples), Prof. E. Semmola discusses the state of our knowledge of the variations of the electrical potential of the air with the altitude. In reference to Le Cadet's result that the potential decreases with the altitude, Prof. Semmola points out that the late Prof. L. Palmieri, in conjunction with himself, had established a similar property previously. Le Cadet found that the potential decreased from 150 to 44 volts in the first kilometre of altitude, and deduced that the potential decreased much less rapidly at greater altitudes. But Semmola thinks that the high potential found at the surface of the earth was at any rate in part due to the obscurity of the superincumbent air.

A SHORT note on the reflection of light in the neighbourhood of the critical angle is given by Mr. J. G. Coffin in the *Technology Quarterly*, the object being to examine more fully than is done in most text-books the consequences of applying Fresnel's formulæ to refraction from a denser to a rarer medium. Tables are calculated by the author and Prof. Pickering, showing the percentages of light reflected at different incidences in passing from a rare to a dense medium and *vice versa*, and the results are exhibited graphically by curves. The paper thus contains an amplification of the superficial information contained in the majority of treatises on optics.

IN the *Journal of Proceedings* of the Institution of Electrical Engineers, xxix. 142, 1900, Mr. Alexander Russell discusses the question how condenser and choking-coil currents vary with the shape of the wave of the applied electromotive force. Various forms of wave being considered, the author finds that the sine curve wave produces the least effective current when applied to a condenser, and the largest magnetising current when applied to a choking-coil. Similar results are established for the symmetric wave in the case of a family of waves of equal height. The subject is sufficiently interesting to make us wish for a fuller mathematical investigation, Mr. Russell's note being a mere statement of results.

SOME tests of fire retardent materials are described by Mr. Charles L. Norton in the *Technology Quarterly*, xiii. 2, for June 1900. The tests were made on October 5, 1899, and February 3, 1900, by setting up small buildings previously constructed in the Massachusetts Institute of Technology and building a fire of wood and oil inside. Observations of the progress

of the fire and of the subsequent state of the wooden backing led to a number of interesting conclusions as to the value of the protection afforded by various retardant materials. Among these we note the comparative value of a wooden and metallic lath; the necessity of applying fire retardant material in at least two thicknesses so as to break joints; the immense superiority of three-ply over two-ply doors; the advantage of the Atkinson composite door as being more gas-tight than a wooden door; the fire-resisting qualities of three-inch plank as compared with one-inch boards, or lath and plaster; the excellency of Mississippi wire glass; and the satisfactory performance of "King's Windsor" cement and "Adamant" plaster.

AN important development of the electron theory has been carried out by Robert Lang in his article on atomic magnetism contributed to the *Annalen der Physik* (No. 7). It may now be said that the phenomena of magnetism have at last been successfully reduced to those of electricity. We know from the work of Thomson and of Drude that an electric current in a wire consists of a stream of very small particles called electrons. These electrons are formed by the splitting up of the metallic atoms into a larger positive and a smaller negative portion. The positive electrons, under the influence of an electromotive force, travel in one direction along the wire, with a velocity of about 1 cm. per second. The negative electrons travel in the opposite direction with the same charge, but with a smaller velocity. The masses are in the ratio of about 9:1. Now according to Lang, the negative electrons revolve round the heavier positive electrons in a magnetised metal, like a planet round the sun, and the electric convection currents thus produced are nothing more or less but Ampère's "elementary molecular currents." Lang calculates the speed of the electrons and the diameter of their orbit. The speed is that of light, and the figures obtained lead to conclusions in close agreement with known facts.

AN interesting article, entitled "Cartographie de la Caverne Mammoth," is contributed by Dr. H. C. Hovey to the *Bulletin de la Société de Spéléologie*, tome v. 1899. The author gives a short history of the attempts to map the celebrated Mammoth Cave, and points out that, owing to objections on the part of the proprietors, the scientific investigation of these caverns is still incomplete. The paper is accompanied by reproductions of the map by Hovey and Call, and that by C. R. Blackall for purposes of comparison.

A VALUABLE addition to our knowledge of the cretaceous geology of Saxony is furnished by Dr. W. Petrascheck in a paper published in the *Abhandl. der Naturwiss. Gesellsch. Isis* (Dresden, 1900). The author seeks to trace the change of facies developed at various horizons in the cretaceous rocks of this area when followed laterally. He explains, as far as possible, the modifications in the character of the fossil fauna which accompany the changes in petrographical facies. The region discussed comprises the neighbourhood of Dresden and the well known "Saxon Switzerland."

THE August number of the *Journal* of the Chemical Society contains the Friedel Memorial Lecture, delivered before the Society by Prof. J. M. Crafts.

THE second English edition of Prof. Ostwald's "Scientific Foundations of Analytical Chemistry," translated from the second German edition by Dr. George M'Gowan, has been published by Messrs. Macmillan and Co. Since the original work was published in 1894, the principles expounded in it have been steadily gaining acceptance, but, so far as we are aware, no English text-book of chemical analysis has appeared in which the analytical methods and reactions of the laboratory are consistently explained in terms of the theory of ions instead of

being represented by the ideal equation-formulæ. As Prof. Ostwald states, the general standpoint of analytical chemistry has undergone but little change; nevertheless, the newer ideas are gradually being applied to laboratory work by lecturers and demonstrators who are in touch with modern chemical theory. The new edition just published will be the means of extending the knowledge of the fundamental principles underlying chemical processes, and will be a source of inspiration to teachers who wish to make analytical chemistry a science as well as an art.

A SIMPLE method of preparing free hydroxylamine is given in a recent number of the *Annalen* (311, 117) by Dr. R. Uhlenhuth. When the phosphate of the base is heated gently under reduced pressure, the base distils over in a state of such purity that the distillate solidifies on placing the receiver into melting ice.

THOUGH the need for a universal standard table of atomic weights is recognised by all chemists, the question whether it shall be constructed upon a basis of  $O = 16$  or  $H = 1$  has yet to be decided. The *Chemical News* publishes a letter from Profs. Bredt, Erdmann, Fischer, Volhard, Winkler and Wislicenus, members of the International Committee on Atomic Weights, upon this point. It is remarked that if cogent reasons necessitate an alteration of the standard of atomic weights, it would be better to start from an element of which the weight can be conveniently ascertained, such an element, for example, as silver or iodine, which also serves as a practical starting-point in consideration of the sharpness of its reactions in numerous analytical operations. But in the opinion of the writers such cogent reasons for an alteration do not present themselves, for the ratio of hydrogen to oxygen has been established with an exactness which fully suffices for all practical purposes. It is felt that the time for an unchangeable table of atomic weights has not yet come; for each succeeding year brings corrections in the atomic weights of the rarer elements, and at the same time speculations as to their simple or compound nature. Opinions are therefore invited upon the following questions:—(1) Shall the unity of hydrogen be retained as the standard for reckoning atomic weights? (2) Shall the atomic weights be given approximately with two decimal places in which the uncertain figures can be recognised by the type? (3) Shall the International Atomic Weight Commission have the current table of atomic weights edited on this basis? Communications should be sent to Herr Prof. J. Volhard, Mühlporfte 1, Halle-a-S.

THE additions to the Zoological Society's Gardens during the past week include a Lioness (*Felis leo*) from South Africa, presented by the Right Hon. Cecil J. Rhodes; a Black-backed Jackal (*Canis mesomelas*), a Leopard Tortoise (*Testudo pardalis*), a Puff Adder (*Bitis arietans*) from South Africa, presented by Mr. J. E. Matcham; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. W. A. Gillett; a Blue and Yellow Macaw (*Ara ararauma*), a Red and Yellow Macaw (*Ara chloroptera*) from South America, presented by Captain G. H. Arnot; a Chinese Quail (*Coturnix chinensis*) from China, two Asiatic Quails (*Perdica asiatica*) from India, two Sparrow Hawks (*Accipiter nisus*), British, presented by Mr. D. Seth-Smith; a Common Quail (*Coturnix communis*), British, presented by Miss F. E. Burt; a Lesser White-nosed Monkey (*Cercopithecus petaurista*) from West Africa, a Polar Bear (*Ursus maritimus*, ♀) from the Polar Regions, two Black-headed Caiques (*Caiuca melanocephala*) from Demerara, a Smooth-headed Capuchin (*Cebus monachus*) from South-east Brazil, a Pleurodele Newt (*Molge walli*), a Leoparding Snake (*Coluber leopardinus*), a Vivacious Snake (*Tarbophis fallax*), six European Pond Tortoises (*Emys orbicularis*), South European; two Egyptian Mastigures (*Uromastix spinipes*), an Algerian Tortoise (*Testudo iberica*) from North Africa, four Alligator Terrapins

(*Chelydra serpentina*) from North America, a Leopard Tortoise (*Testudo pardalis*) from South America, two Argentine Tortoises (*Testudo argentina*) from the Argentine Republic, deposited; a Gold Pheasant (*Thaumalea picta*, ♂) from China, two Little Bitterns (*Ardetta minuta*), European, purchased; a Burrhel Wild Sheep (*Ovis burrhel*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

COMET BORRELLY-BROOKS (1900 *b*).—The following elements and ephemeris are furnished by Herr J. Möller in the *Astronomische Nachrichten* (Bd. 153, No. 3654).

Elements.

T = 1900 Aug. 3.298 Berlin Mean Time.

$$\left. \begin{aligned} \omega &= 12^\circ 30' 2'' \\ \Omega &= 328^\circ 1' 8'' \\ i &= 62^\circ 35' 6'' \end{aligned} \right\} 1900^{\circ} 0$$

$$\log q = 0.00636$$

Ephemeris for 12h. Berlin Mean Time.

1900.	R.A.			Decl.	Br.
	h.	m.	s.		
Aug. 16	3	50	8	+75 55.7	0.63
17	4	0	12	77 36.3	60
18	4	12	37	79 10.3	56
19	4	23	4	80 37.7	53
20	4	47	52	81 57.7	50
21	5	13	26	83 9.5	48
22	5	47	9	84 11.4	45
23	6	31	8	85 0.8	42
24	7	26	5	85 34.6	40
25	8	28	54	+85 49.3	0.38

EPHEMERIS FOR OBSERVATIONS OF EROS.—The following is a continuation of co-ordinates computed by Herr F. Kistenpart (*Astronomische Nachrichten*, Bd. 152, No. 3643).

Ephemeris for 12h. Berlin Mean Time.

1900.	R.A.			Decl.
	h.	m.	s.	
Aug. 16	2	0	29.40	+27 56 22.5
18	3	19	51	28 38 11.6
20	6	6	71	29 20 17.4
22	8	50	73	30 2 40.0
24	11	31	33	30 45 19.5
26	14	8	25	31 28 16.1
28	16	41	22	32 11 29.5
30	2	19	10.01	32 54 59.5

THE ASTROGRAPHIC CHART CONFERENCE.—The fourth meeting of the International Committee for directing the photographic delineation of the sky has recently been held in Paris, commencing July 19. The first matter taken in hand was the appointment of a sub-committee of nine astronomers to draw up a scheme for the systematic observation of Eros during the coming opposition, for determinations of solar parallax. The reports from the co-operating observatories show that in fifteen of them the work is being vigorously pushed forward; unfortunately, in the remaining three, Rio de Janeiro, La Plata and Santiago (Chili), the work has entirely fallen through.

Dr. Thome, of the Cordoba Observatory, has been enabled, by the generosity of the Argentine Government, to volunteer for the work assigned to La Plata (−24° to −31°), and M. Enrique Legrand stated that he had induced his Government to found an observatory near Monte Video (Uruguay) to carry out the zone (−17° to −23°) allotted to Santiago. It was also suggested that the new observatory at Perth, West Australia, might possibly carry out the work on the remaining zone (−32° to −40°).

Another important item of the discussion was the advisability of publishing the rectangular co-ordinates of the stars as measured, with, of course, the constants of each plate, or delaying the work until these could be transferred to equatorial co-ordinates. It was considered that in the near future the absolute positions of the comparison stars would be much more accurately known than at present. The only drawback to this scheme is that Dr. Scheiner, of Potsdam, has already started the publication of the catalogue giving R.A. and Decl. of the stars.

In connection with the assignation of photographic magnitudes, it appeared to be generally believed that the estimation of diameters by means of a scale is a surer plan than measurement with a micrometer for this particular branch of work, but no definite ruling was given on this point.

The original plan agreed to in 1896 for taking the chart plates with three exposures of 30m. each has not been followed at all the observatories, and it was resolved at this meeting that in future the method of taking the chart plates shall be decided by the individual directors. In the reproduction of these chart plates, it is unlikely that uniformity will be secured; the French observatories have made enlarged copies by heliogravure, but as each observatory would have to expend some 10,000*l.* to do this, the actual method of reproduction is left unsettled.

DETERMINATION OF SOLAR PARALLAX.—A circular has been issued by the special committee appointed by the International Astrophotographic Conference held recently at Paris containing the resolutions passed for systematising the work to be done at all the world's observatories during the coming autumn and winter, when it is hoped, by means of observations of the minor planet Eros, to determine the parallax and distance of the sun with a degree of accuracy previously unattainable. The following is a summary of the suggestions adopted:—

(1) That the determination of parallax of Eros be made by micrometric, heliometric and photometric measurements. (a) By observations of the planet east and west of the meridian at the same observatory. (b) By the co-operation of the observatories of Europe and North America. (c) By the co-operation of the observatories of the northern and southern hemispheres.

(2) During the period of parallax observations the diurnal movement of Eros should be determined as accurately as possible by heliometer, micrometer and photography.

(3) (a) Observers determining the parallax in right ascension should make measures each night and morning, profiting by all favourable circumstances to operate with as large hour angles as possible. (b) Observers finding parallax by difference of declination in northern and southern hemispheres, should arrange that the mean instants of observation do not vary much from the meridian passage of the planet at the southern station.

(4) It is necessary that special series of photographs be taken of the region traversed by Eros, in order to furnish accurate determinations of the positions of comparison stars.

As the varying atmospheric conditions will play an exceedingly important part in the observations, particularly those away from the meridian, MM. André and Prosper Henry have been asked to prepare suggestions for eliminating these difficulties.

At the time of writing, the following observatories have signified their intention of helping with the scheme:—Algiers, Athens, Bamberg, Bordeaux, Cambridge (England), Cambridge (U.S.), Cape of Good Hope, Catania, Cordoba, Chicago (Verkes), Edinburgh, Greenwich, Heidelberg, Leyden, Leipzig, Lyons, Marseilles, Minneapolis (U.S.), Mount Hamilton (Lick), Nice, Potsdam, Rome, San Fernando, Strassburg, Tacuboya, Toulouse, Upsala, Vienna (Ottahring), Vienna (Währing), Washington.

THE DISTANCE TO WHICH THE FIRING OF HEAVY GUNS IS HEARD.

IN a discussion which took place in NATURE some time ago on the so-called "Barisal Guns" and other mysterious sounds, Prof. Hughes suggested that it would be desirable to ascertain how far the firing of guns can be heard (vol. liii. p. 31). In connection with another subject, that of spurious earthquakes (see NATURE, vol. lx. pp. 139-141), I have for some time been collecting notes on this point, and I propose here to describe some of the facts obtained, chiefly with regard to the great naval review at Spithead on June 26, 1897, and the operations of the French fleet at Cherbourg on July 18, 1900.

I will mention first a few cases referring to more or less isolated observations of the reports of distant guns. The firing during the battle of Camperdown on October 11, 1797, is said to have been heard in Hull, the distance between the two places being more than 200 miles. A gentleman, formerly resident at Kertch in the Crimea, informs me that he has heard the sound of the guns fired at Sebastopol, distant 158 miles. During the American Civil War, the roar of the guns at the battles of Malvern Hill and Manassas (or Bull Run) was perceptible at